

### 3.2 Medical Requirements Overview

**TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW**

<b>MRID# and Title:</b>	MR010S Clinical Laboratory Testing for Short-Duration Flights
<b>Sponsor:</b>	Medical Operations
<b>IPT:</b>	N/A
<b>Category:</b>	Medical Requirements (MR)
<b>References:</b>	<u>Space Shuttle Medical Operations Requirements Document (MORD)</u> , JSC 13956 2.1 Crewmember Medical Evaluations and Certifications 2.1.2 Preflight Medical Evaluations 2.1.3 Postflight Medical Evaluations 5.2 Clinical Laboratory Support  <u>Astronaut Medical Evaluation Requirements Document (AMERD)</u> , JSC 24834, Vol. 1B Section 3.2 Preflight Evaluations Section 3.4 Postflight Evaluations
<b>Purpose/Objectives:</b>	To evaluate crewmember medical fitness for flight and for postflight recovery by the analysis of clinical specimens.
<b>Measurement Parameters:</b>	Clinical laboratory examination includes blood for hematology, clinical chemistry, and urine for routine urinalysis.
<b>Deliverables:</b>	Preflight and postflight Clinical Laboratory report of test results, electronically delivered to the flight surgeon via the electronic medical record system.
<b>Flight Duration:</b>	<30 days
<b>Number of Flights:</b>	All flights
<b>Number and Type of Crew Members Required:</b>	All crewmembers
<b>Other Flight Characteristics:</b>	Short-Duration Crew Microbiology is referenced in MR021S

### 3.3 Preflight Training – None

### 3.4 Preflight Activities

**TABLE 3.4: PREFLIGHT ACTIVITIES**

<b>Preflight Activity</b>	<b>Description:</b>	Clinical Laboratory Assessment will be performed approximately on L-10 days. The examination will include collection of blood and urine from crewmembers for analyses to enhance the physician’s medical evaluation of preflight crew health.				
	<b>Schedule:</b>	Clinical Laboratory Assessment will include the following: <ul style="list-style-type: none"><li>• <u>Blood</u>: CBC with white cell differential, chemistry panel, archive serum tube</li><li>• <u>Urine</u>: Urinalysis on random urine sample</li></ul>				
		<b>Duration:</b>	<b>Schedule:</b>	<b>Flexibility:</b>	<b>Blood Volume:</b>	<b>Personnel Required:</b>
		Blood Collection- 10 min.	L-10 days	N/A	16.5 ml	Crewmembers/ Lab Personnel
		Random Urine Collection- 5 min.	L-10 days	N/A	N/A	Crewmember
<b>Ground Support Requirements Hardware/Software</b>	<b>Preflight Hardware:</b>		<b>Preflight Software:</b>	<b>Test Location:</b>		
	Blood collection supplies & consumables Random urine collection supplies & consumables Hematology instrumentation & consumables Chemistry instrumentation & consumables		N/A	U.S.		
<b>Testing Facilities</b>	<b>Minimum Room Dimensions:</b>	<b>Number of Electrical Outlets:</b>	<b>Temperature Requirements:</b>		<b>Special Lighting:</b>	
	Two rooms, each with dimensions of 10’ x 10’.	Minimum 6	Ambient		Sufficient lighting for blood collection & laboratory bench work.	

	Hot or Cold Running Water:	Privacy Requirements:	Vibration/Acoustic Isolation:	Other:
	Sink with hot and cold water for hand-washing.	Private rooms free from distractions.  Access to restroom for urine collection.	N/A	<b><u>Room 1 (Laboratory):</u></b> Countertops or tables, cabinets, 4 chairs (minimum), refrigerator/freezer, and centrifuge, in a room designated "Laboratory", including laboratory instruments <b><u>Room 2 (Blood Collection Area):</u></b> Gurney (1), table (1), and chairs (2) in an area designated "Sample Collection Area". <b>Restroom</b>
<b>Constraints/Special Requirements:</b>	<ul style="list-style-type: none"> <li>• Crewmember is required to be fasting 12 hrs. before blood draw.</li> <li>• No alcoholic beverages shall be consumed 12 hrs. before blood draw.</li> <li>• Upon completion of analyses, any remaining aliquots of blood are archived frozen at the JSC Clinical Laboratory.</li> <li>• If the L-10 day clinical laboratory testing occurs during the 3-month annual exam window (2 months prior to the birth month or during the birth month), the flight surgeon may request that laboratory testing on L-10 be augmented to meet the requirements for both the flight and annual physical exam.</li> </ul>			
<b>Launch Delay Requirements:</b>	If more than 20 days have elapsed from the original launch date, a subset of the L-10 laboratory analysis may be repeated at the discretion of the Crew Surgeon.			
<b>Notes:</b>	N/A			
<b>Data Delivery</b>	<b><u>Data/Report to Designated Recipients (Nominal/Contingency):</u></b> <ul style="list-style-type: none"> <li>• All hematology, urinalysis and clinical chemistry data will be electronically delivered to the flight surgeon within 24-72 hours after laboratory receives samples.</li> <li>• Reports from test samples sent to a reference laboratory will be delivered to the flight surgeon as the results are received in the Clinical Laboratory</li> </ul>			

**3.5 In-Flight Activities – None**

### 3.6 Postflight Activities

**TABLE 3.6: POSTFLIGHT ACTIVITIES**

Postflight Activity	Description:	Clinical Laboratory Testing will be performed on R+0 (landing day). The examination will include collection of blood and urine for analyses to enhance the physician’s medical evaluation of postflight crew health.				
		Clinical Laboratory Testing will include the following: <ul style="list-style-type: none"><li>Blood: I-Stat chemistry (Na / K / Glucose / iCa / pH), archive serum tube (for Chemistry or other tests indicated)</li><li>Urine: Urinalysis on random urine samples</li></ul>				
	Schedule:	Duration:	Schedule:	Flexibility:	Blood Volume:	Personnel Required:
		Blood Collection - 10 min.	R+0	N/A	9.7 ml	Crewmembers/ Lab Personnel
		Random Urine Collection - 5 min.	R+0	N/A	N/A	Crewmember
Ground Support Requirements Hardware/Software	Postflight Hardware:		Postflight Software:		Test Location:	
	Blood collection supplies & consumables Random urine collection supplies & consumables Hematology instrumentation & consumables Chemistry instrumentation & consumables		N/A		U.S.	
Testing Facilities	Minimum Room Dimensions:		Number of Electrical Outlets:		Temperature Requirements:	Special Lighting:
	Two rooms, each with dimensions of 10’ x 10’.		Minimum 6		Ambient	Sufficient lighting for blood collection & laboratory bench work.
	Hot or Cold Running Water:		Privacy Requirements:		Other:	
	Sink with hot and cold water for hand-washing.		Private rooms free from distractions.  Access to restroom for urine collection.		<u>Room 1 (Laboratory):</u> Countertops or tables, cabinets, 4 chairs (minimum), refrigerator/freezer, and centrifuge in a room designated “Laboratory”, including laboratory instruments <u>Room 2 (Blood Collection Area):</u> Gurney (1), table (1), and chairs (2) in an area designated “Sample Collection Area”. <b>Restroom</b>	
	Constraints/Special Requirements:		Upon completion of analyses, any remaining aliquots of blood samples are archived frozen in the JSC Clinical Laboratory.			

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<b>Notes:</b>	N/A		
<b>Data Delivery</b>	<b>Data/Report to Designated Recipients (Nominal/Contingency):</b>	<b>Mission Summary Report:</b>	<b>Data Archives:</b>
	<ul style="list-style-type: none"> <li>All hematology, urinalysis and clinical chemistry data will be electronically delivered to the flight surgeon within 24-72 hours after laboratory receives samples.</li> <li>Reports from test samples sent to a reference laboratory will be delivered to the flight surgeon as the results are received in the Clinical Laboratory.</li> </ul>	N/A	Electronic report available through computer inquiry.

**3.7 Summary Schedule****TABLE 3.7: SUMMARY SCHEDULE**

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	BLOOD VOLUME	PERSONNEL REQUIRED	CONSTRAINTS
<b>Preflight Training – N/A</b>						
<b>Preflight</b>						
Blood Collection	10 min.	L-10 days	N/A	16.5 ml	Crewmembers/ Lab Personnel	-Fasting 12 hrs (except water) -No alcoholic beverages consumed 12 hrs before blood draw -If the L-10 day clinical laboratory testing occurs during the 3-month annual exam window (2 months prior to the birth month or during the birth month), the flight surgeon may request that laboratory testing on L-10 be augmented to meet the requirements for both the flight and annual physical exam.
Random Urine Collection	5 min.	L-10 days	N/A	N/A	Crewmembers	Self-collected
<b>In-Flight: N/A</b>						
<b>Wheels-Stop: N/A</b>						
<b>Postflight:</b>						
Blood Collection	10 min.	R+0	N/A	9.7 ml	Crewmembers/ Lab Personnel	None
Random Urine Collection	5 min.	R+0	N/A	N/A	Crewmembers	Self-collected
<b>Postflight Debrief: N/A</b>						